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Knowledge, Attitude and Practice of Antibiotic Use among University Students: A Cross Sectional Study in Mansoura University - Egypt

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Abstract

***Background**: Antibiotic resistance has become a marker of irrational and overuse of Antibiotics in many countries. The aim of the present study was to evaluate the knowledge, attitude and practice (KAP) of antibiotic use among Mansoura University students in Egypt.*

***Methods**: A descriptive cross-sectional study was conducted amongst 810 students, randomly chosen from medical and non-medical faculties at Mansoura University, Egypt. A predesigned pre-tested interview questionnaire was used to assess their KAP of antibiotic use.*

***Results**: Data was entered and analyzed using SPSS software, revealing that 93.2%, 90.1%, 93.3% of the studied students had poor knowledge, poor attitude and poor practice of antibiotic use, respectively. The most significant predictive factors for poor KAP were young age and being non-medical students. The need for educational programs targeting University students is very crucial in combating this problem.*

Keywords: *Antibiotic abuse -Self medications-University Students, knowledge, attitude, practice*

Introduction

Antimicrobial resistance (AMR) carries a serious worldwide growing concern to human, animal, and environmental health. This is because of the emergence, spread, and persistence of multidrug-resistant bacterial strains with the plausible causes of such crisis which include increased antibiotics' use in animals (food, pets, aquatic) and human beings, increased international travel, improper sanitation/ hygiene, antibiotic agents sold over-the-counter and release of non-metabolized antibiotic agents or their residues into the environment through manure/ stool[(1)]. Without prompt action, the annual mortality toll canhit10 million by 2050, which is greater compared with mortality related to malignancy, measles, cholera, and traffic accidents combined [(2)].

Self-medication involves the utilization of drugs or any pharmaceutical products by the public for treatment of common health issues, self-diagnosed health problems, or the intermittent or continuous utilization of drugs or chronic or recurrent diseases or symptoms without doctor prescription [(3)]. This has

become a worldwide concern worrying researchers, due to its irrational usage, particularly in adolescents and college students. This is due to several factors including public knowledge and attitudes toward antibiotics, unregulated sell of antibiotics, and unrestricted regulations of antibiotic agents.

Overuse of antibiotic agents or utilizing them irrationally can cause not only bacterial AMR but also adverse effects, and can also result in an economic burden on national health systems [4].

So, controlling antibiotics usage necessitates feasible interventions. Several strategies have been suggested for their usage including a formulary replacement or restriction, health-care provider education, feedback activities, approved requirement from an infectious disease specialist for drug prescription and a more rational use of antimicrobials worldwide[5].

Students may have an essential role in decreasing the improper usage of antibiotics; likewise, a lot of data in literature have emphasized on their attention on studying the Knowledge, attitude and practice (KAP) of medical and non-medical students towards antimicrobials utilization[6] .

In spite of the significance of antibiotic abuse problem between university students, to authors' knowledge, few Egyptian research reassessed such an issue in medical and non-medical students at A in Shams[7] and Suez Canal Universities[8], respectively. Also, another study was done among Mansoura university students to investigate self-medication problem, The ratio of self-medication was demonstrated to be 62.9% with markedly greater in the medical individuals in comparison with non-medical ones (72.4% and 52.6%, respectively[9]. So, this study aimed to assess the current KAP of antimicrobials utilization between students in Mansoura University. Uncovering related factors are important in order to intervene effectively.

Methods

Study Population

A descriptive cross-sectional study was conducted at Mansoura University, Egypt including 1st and last year medical students (faculties of medicine, pharmacy, dentistry) as well as non-medical (commerce, engineering and art) faculties during their first academic year 2019-2020.

Sample Size

It was online calculated (https://www.dssresearch.com/). From an earlier work [10] in Tehran (Iran), the prevalence of antibiotic self-medication was shown to be 53 %; the sample size was 405 with 95% CI and 80% study power. It was ten multiplied by 2 for compensation for the design influence of the cluster sampling method used. Therefore, the final sample size was approximately 810.

Sampling Procedure

A multistage, stratified, cluster sampling procedure was used. As an initial step, university students were stratified into medical students (belonging to faculties of medicine, dentistry, pharmacy, nursing, as well as veterinary medicine) and non-medical students (belonging to faculties of engineering, education, commerce, agriculture, law, and arts). The sample size was distributed proportionally among these 2 categories. Then, one college or more were chosen from all groups using lottery approach. Finally, in each college, students underwent stratification into the 1st and final academic years. From each stratum, a cluster was haphazardly selected and entire students in these selected clusters were involved. Thus, 810 students were registered in 27 selected clusters (30-35 students in each) and a 810 questionnaires were distributed with a 100% response rate.

Study Tool

A predesigned pre-tested interviewer-administered questionnaire [11] was used to collect the data. The 1st section covered participants' demographic data including gender, age, college type and residency. The 2nd section included the source of antimicrobials utilized by students in the last time they used antibiotic. The 3rd section evaluated students' knowledge about indications of antibiotics (bacterial infections, viral infections, common cold, pain, fever and), antimicrobial efficacy, safety and reasons associated with AMR (e.g. unnecessary usage, not finishing antimicrobials course, self-medication, drug-drug interactions and utilization of various antibiotic brands). This section contained sixteen questions, evaluated using 'right', 'wrong' and 'uncertain' responses. In the fourth and fifth sections, 5-point Likert scales were utilized for determination of the attitudes and practices, respectively. The attitudes and beliefs section focused on students' attitudes as regards the selection and usage patterns of antibiotics. The practices part assessed students' behavior regarding antibiotics' usage, and their compliance to dose regimens and duration of treatment courses.

Each part contained ten questions. The questionnaire was translated into Arabic by 2 different translators and back translated to English to ensure linguistic validity. It was validated by 3 experts in public health and 2 experts in chest medicine. The questionnaire was pre-tested for content, design, readability and comprehension on 40 students (13 medical and 27 non-medical students). Necessary medications were performed so that the questionnaire was easy to be answered and gave correct data. The pre-test data was discarded in the final analysis. Cronbach's alpha was utilized to evaluate the internal consistency of the questionnaire. The alpha coefficients of KAP parts were 0.87, 0.84 and 0.82, respectively, confirming the adequacy of the internal consistencies of questions. For quantitative analysis, a score exceeding 80% of the possible maximum score was considered good, between 60- 80% was considered moderate and below 60% was considered poor [12].

Ethical Consideration

The current study obtained its approval from the Vice Dean of the Students' Affairs and the Institutional Research Board, Faculty of Medicine, Mansoura University. A written consent was obtained from all involved subjects. They were informed that, they had the right to leave this study at any time with no reasons. Privacy and confidentiality were respected at all levels.

Data Analysis

Data was analyzed by Statistical Package for Social Sciences (SPSS) version 16. Qualitative data were expressed as number and percent. Chi-square (x^2) test was utilized to compare between groups. Quantitative data were expressed as means (SD) after being tested for normality using Kolmogorov-Smirnov test. Independent sample t-test was used for comparison between groups. Binary stepwise logistic regression analysis was utilized to predict independent variables of poor practice. Significant predictors were entered into regression model. Odds ratios and 95% I were calculated. "pvalue≤0.05"was considered as statistically significant in both univariate and multivariate analysis.

Results

This study included 810 university students. Their mean age was 20.2 ± 1.7 years with nearly equal distribution regarding their gender. About 56.4% of the students were urban, the medical students accounted for 20% whereas 80% were non-medical; about 37.5 % were in the final academic year. Nearly 37.8 % of the students reported that at least one member of family works in health related field. The frequency of antibiotics utilization in the last year was three times or more among 54.9% of the students. Students reported that the main sources of last used antibiotic were purchased them from retail pharmacies using a clinician's prescription (45.3%), Purchased them from pharmacies without a prescription (44.1%) , Left-over antibiotics(6%) and from other sources such as friends (4.6%). Poor knowledge, attitude and practice were found among 93.2%, 90.1% and 93.3% of the students; respectively as shown in figures (1-2).

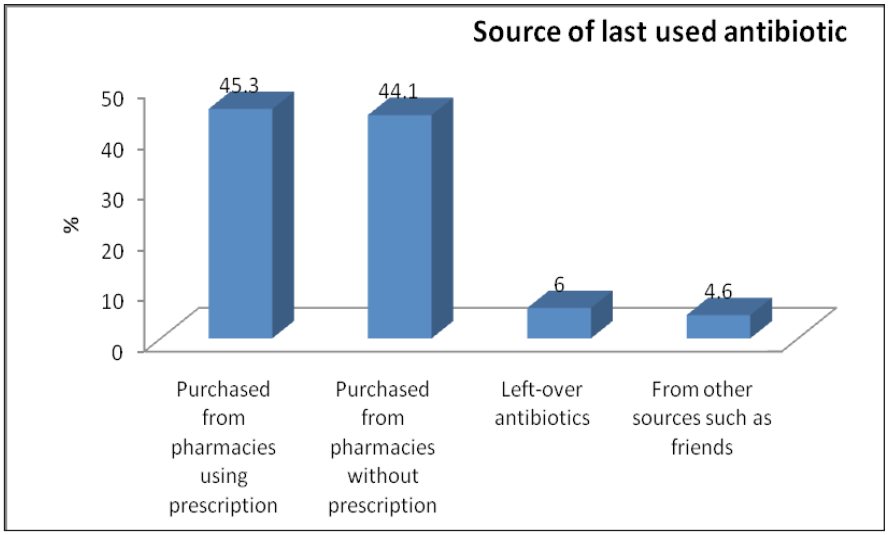

Figure1. *Distribution of studied student according to source of last used antibiotic*

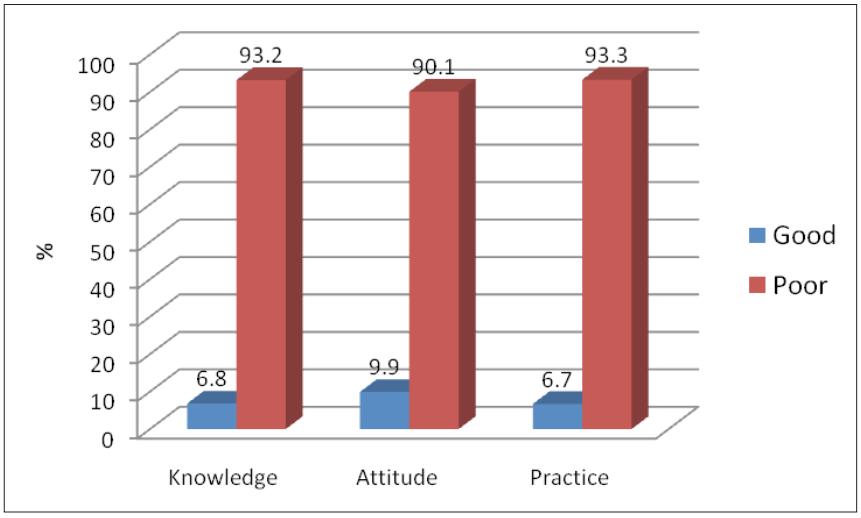

Figure2. *Distribution of studied student according to their KAP*

TableI. *Association of demographic characteristics and poor knowledge, attitude and practice of antibiotic use among university students*

Factors	Total N=810	Poor knowledge		OR (95%CI)	Poor attitude		OR (95%CI)	Poor practice		OR (95%CI)
		n(%)	p		n(%)	p		n(%)	p	
Age/years:										
<20	349	345(98.9)	χ^2=30.86	10.7	337(96.6)	χ^2=28.6	4.86	342(98.0)	χ^2=21.41	5.55
≥20(r)	461	410(88.9)	P<0.001*	(3.84-29.98)	393(85.2)	P<0.001*	(2.58-9.13)	414(89.8)	P<0.001*	(2.48-12.43)
Gender:										
Male	446	422(94.6)	χ^2=3.11	1.64	412(92.4)	χ^2=5.7	1.75	419(93.9)	χ^2=0.59	1.24
Female (r)	364	333(91.5)	P=0.08	(0.94-2.84)	318(87.4)	P=0.01*	(1.09-2.79)	337(92.6)	P=0.43	(0.72-2.16)
Residence:										
Urban(r)	457	413(90.4)	χ^2=13.34	3.3	404(88.4)	χ^2=3.48	1.58	422(92.3)	χ^2=1.66	1.46
Rural	353	342(96.9)	P<0.001*	(1.68-6.51)	326(92.4)	P=0.06	(0.97-2.57)	334(94.6)	P=0.19	(0.82-2.6)
Faculty										
Medical(r)	163	112(68.7)	χ^2=193.5	73.2	104(63.8)	χ^2=158.8	16.9	144(88.3)	χ^2=8.2	2.3
Non-medical	647	643(99.4)	P<0.001*	(25.9-206.5)	626(96.8)	P<0.001*	(9.86-29.0)	612(94.6)	P=0.004*	(1.28-4.15)
Academic grade										
First	506	491(97.0)	χ^2=31.18	4.96	481(95.1)	χ^2=36.9	4.25	491(97)	χ^2=29.6	4.82
Last(r)	304	264(86.8)	P<0.001*	(2.69-9.15)	249(81.9)	P<0.001*	(2.59-6.99)	265(87.2)	P<0.001*	(2.61-8.9)
working in health related field #										
Yes (r)	306	272(88.9)	χ^2=14.5	0.35	261(85.3)	χ^2=12.9	0.43	283(92.5)	χ^2=0.57	0.81
No	504	483(95.8)	P<0.001*	(0.19-0.61)	469(93)	P<0.001*	(0.27-0.69)	473(93.8)	P=0.45	(0.46-1.4)
Antibiotic use in last year										
Never(r)	117	111(94.9)	.....	1	106(90.6)	....	1	91(77.8)	..	1
<3 times	248	222(89.5)	p=0.09	0.5(0.2-1.2)	215(86.7)	p=0.3	0.7(0.3-1.4)	225(90.7)	p=0.007*	2.8(1.5-5.2)
≥3 times	445	422(94.8)	p=0.98	0.9(0.4-2.5)	409(91.9)	p=0.6	1.2(0.6-2.4)	440(98.9)	p<0.001*	25.1(9.4-67.2)

#(at least one of family members). r: reference group

In table (I), age less than 20 years , rural residence ,being a student in first academic grade , were significantly associated with poor knowledge among studied students (OR : 10.7 , 3.3 , 73.2 & 4.96, respectively). Similarly , age less than 20 years, male students , non-medical students , being in first academic grade were also significantly associated with poor attitude (OR: 4.86 ,1.75 , 16.9, 4.25 , respectively). Poor practice was significantly associated with age less than 20 years , non-medical students ,first academic year students and antibiotic use during last year ever either less than 3 times or ≥3 times (OR:5.55 , 2.3 , 4.82 ,2.8 &25.1, respectively). Having at least one of family members working in medical field was significantly associated with lower risk of developing poor knowledge & poor attitude (OR:0.35& 0.43 , respectively).

TableII. *regression analysis to detect predictors of poor knowledge, attitude and practice of antibiotic use among university students*

predictors	Poor knowledge		Poor attitude		Poor practice	
	p	AOR(95%CI)	p	AOR(95%CI)	p	AOR(95%CI)
Age/years <20 ≥20(r)	 0.03*	 3.27(1.1-9.9) 1	 0.02*	 2.16(1.08-4.3) 1		
Residence Urban(r) Rural	 0.04*	 1 2.18(1.03-4.6)	 <0.001*	 1 13.5(7.7-23.8)		
Faculty Medical(r) Non-medical	 <0.001*	 1 50.9(17.7-145.9)				
Academic grade First Last(r)					 <0.001*	 5.9(3.1-11.3) 1
Antibiotic use in last year never(r) <3 times ≥3 times					 <0.001* <0.001*	 1 3.39(1.77-6.5) 31.02(11.3-85.1)
percent predicted= model χ^2= constant=	93.2% 161.05 0.45		90.1% 128.7 0.47		93.3% 97.49 3.73	

Significant risk factors detected by univariate analysis are entered into regression analysis using Forward Wald technique. r: reference group

Table (II) shows the results of logistic regression. Age less than 20 years , rural residence and non medical students were significant predictors of poor knowledge among studied groups with overall percent predicted 93.2%, while age less than 20 years and rural residence were only the statistically significant predictors of poor attitude among studied students with the overall percent predicted 90.1%. First academic year students and antibiotic use during the last year were significant predictors of poor practice with overall percent predicted 93.3%.

Discussion

The present study high lightened the main predictors of poor KAP among university students. The main significant predictors of poor knowledge were; students with age more than 20 years , rural residence and non-medical students with odds ratio (3.27 , 2.18 & 50.9 , respectively) and this comes in line with findings of a study carried out by Yinget al [13] on medical and non-medical Chinese students and found that non- medical students were significantly at higher risk for poor knowledge , attitude and practice towards antibiotic use than students in medical faculties. Similarly, in the study carried out by Awad & Aboud [14] on 770 randomly selected Kuwaiti individuals, it was revealed that individuals with high education and those who are working or studying in a health-

care related field expressed better positive attitude compared with individuals with lower education (p = 0.006) and individuals who did not work or study in a health-care related facility(OR: 2.05; CI: 1.30–3.23; p = 0.002). Medical Jordan students in Ghadeer et al [15] study, found that medical students had significantly higher correct knowledge frequency than non medical students.

Younger age (≤20 years) was also significantly associated with poor attitude among dental and paramedical students in the cross sectional study carried out in India. Poor knowledge, attitude and practice in same study was significantly associated with lower education. In the study by Bing and colleagues [16] on university students in China, non-medical students and younger age students were shown to be significantly linked to lower knowledge and attitude median scores.

Poor practice in the present study was significantly associated with lower academic grade and frequency of using antibiotics more than 3 times during last year (OR:3.39 & 31.02, respectively). This come in line with the results of the study carried out on University students in China and found that lower college grade was significantly associated with poor practice [16].

The most frequent source of antibiotic use in the present study was from retail pharmacies utilizing a physician's prescription (45.3%) that was lower than the rate detected by the study carried out on non-medical students in Nigerian University (68.3%). However, pharmacist recommendations in the present study was higher than detected by the Nigerian study 44.1% versus 11.0% [17].

Recommendations

There is unpredictably high prevalence of self-medication practices between both medical and non-medical students which may be related to the long waiting queues at hospitals and country weak and unrestricted regulations. This results in a weak control of drug sales in pharmacies with no prescription as well as advertisements that influence youth decision for self-medication. Recommended solutions in order to overcome such issue might involve the next approaches: (i) the health professional has to actively share in counseling and public health education in terms of improper usage of drugs, (ii) health facilities have to be ready and easily available for all individuals, and (iii) firm regulations as regards pharmaceutical advertisement as well as medicines' supply without a prescription have to be established.

Conclusion

Most of the studied students showed poor knowledge, attitude and practice. Younger age students and students with non-medical education were the significant predictors with urgent need for health education program targeting this age group. Appropriate counseling along with public health education in association with firm rules upon pharmaceutical advertising and supply can be efficient interventions.

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